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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/989,263	11/19/2001	Michael A. Lamson	TI-31189	8850

7590

08/29/2003

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EXAMINER

MALDONADO, JULIO J

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 08/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/989,263

Applicant(s)

LAMSON ET AL.

Examiner

Julio J. Maldonado

Art Unit

2823

-- **Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,10-12,14-16 and 18 is/are rejected.
- 7) ☒ Claim(s) 2,8,9 and 13 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. The non-final rejection as set forth in paper No.8 is withdrawn in response to applicants' request for reconsideration.
2. A new rejection is made as set forth in this Office Action.
3. Claims 1-16 and 18 are pending in the application.

Specification

4. The disclosure is objected to because of the following informalities: page 9, lines 13-18 makes reference to a table 1, which is not in the specification.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 16 and 18 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 16 and 18 recite, "...a low dielectric constant sheath surrounding each wire, said sheath covering substantially only said wire and wire connections to said pads on said integrated circuit chip and to said conductive leads, and not covering other portions of said chip and said conductive leads...". However, according to page 10, lines 20-23 of the submitted specification,

"...the coating...which has been applied after the wire bonding process, extends into both the chip surface and the portion of the lead where the wire is attached. This extension of the dielectric coating provides further reliability enhancement to the device by covering the fragile bond pad metallization..."

Also, claims 16 and 18 are indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 16 and 18 recite, "...said sheath covering substantially only said wire...". This renders the claims indefinite since they encompass an open term (i.e., substantially) followed by a closed term (i.e., only).

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 14 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 14 and 15 recite "...a device as in claim 1, wherein said cavity package shell...". This renders the claims indefinite since there is no description on claim 1 of a "cavity package shell".

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

10. Claim 1 is rejected under 35 U.S.C. 102(a) as being anticipated by the Applicants' Admitted Prior Art in the instant specification.

The prior art (instant Figs.1a-c) teaches a plurality of substantially parallel, closely-spaced wire bonds (11) connecting pads on an integrated circuit chip (10) to conductive leads (12); a low dielectric constant sheath (not shown) comprising parylene surrounding each wire; and a mold compound (not shown) encasing the chip (10), sheathed wires (11) and leads (12) (instant page 1, line 8 – page 3, line 21).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art.

The prior art (instant Figs.1a-c) teaches a plurality of substantially parallel, closely-spaced wire bonds (11) connecting pads on an integrated circuit chip (10) to conductive leads (12); a low dielectric constant sheath (not shown) comprising parylene surrounding each wire; and a mold compound (not shown) encasing the chip (10), sheathed wires (11) and leads (12) (instant page 1, line 8 – page 3, line 21).

The prior art fails to teach wherein the thickness of the dielectric sheath is 2.5 microns, minimum on each surface; and wherein the distance between wires is in the range of 50 to 100 microns. Notwithstanding, it would have been an obvious matter of

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design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

In reference to claims 4, 6 and 7, the prior art teaches substantially all aspects of the invention but fail to show the effective dielectric constant of the sheath surrounding the bond wires is in the range of 1.0 to 2.3; the mutual capacitance between bond wires is lower by a factor of 3; and the dielectric constant of the molding compound is in the range of 3.8 to 4.2. However, the selection of the claimed ranges is obvious because it is a matter of determining optimum process condition by routine experimentation with a limited number of species. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the above-mentioned ranged to arrive at the claimed invention.

13. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art as applied to claims 1, 3 and 5-7 above, and further in view of Choi (U.S. 6,013,109).

The prior art substantially teaches all aspects of the invention but fail to show that said device is a Ball Grid Array package or a leaded surface mount package. However, Choi et al. (Figs.3A-3D) teach a crack-resistance semiconductor package including the device packaged in a ball grid array package or as a leaded surface mount package (column 2, line 66 – column 3, line 45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable the package of the prior art to be a Ball Grid Array package or a leaded surface mount package.

14. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art in view of Kim et al. (U.S. 5,801,074).

The prior art (instant Figs.1a-c) teaches a plurality of substantially parallel, closely-spaced wire bonds (11) connecting pads on an integrated circuit chip (10) to conductive leads (12); a low dielectric constant sheath (not shown) comprising parylene surrounding each wire; and a mold compound (not shown) encasing the chip (10), sheathed wires (11) and leads (12) (instant page 1, line 8 – page 3, line 21).

The prior art fails to teach a semiconductor package having leads, a substrate, and a housing shell surrounding an open cavity. However, Kim et al. (Figs.7a-7b) teach an air-tight semiconductor package including a housing shell (71) surrounding a cavity (column 3, line 24 – column 9, line 46). Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine the teachings

of the prior art and Kim et al. to enable substituting the mold compound of the prior art with the housing shell of Kim et al., and furthermore since this would result in a semiconductor package with improved air leakage and high yield (column 9, lines 18 – 46).

Double Patenting

15. Claim 13 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 2. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Allowable Subject Matter

16. Claims 2, 8 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

17. The following is a statement of reasons for the indication of allowable subject matter: the prior art (instant Figs. 1a-c) teaches a plurality of substantially parallel, closely-spaced wire bonds (11) connecting pads on an integrated circuit chip (10) to conductive leads (12); a low dielectric constant sheath (not shown) comprising parylene surrounding each wire; and a mold compound (not shown) encasing the chip (10), sheathed wires (11) and leads (12) (instant page 1, line 8 – page 3, line 21). However, the prior art fails to teach forming the low dielectric constant sheath from a foamed polymer comprising foamed polyurethane or a foamed thermoplastic polymer.

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Eysermans to U.S. 4,048,670 teaches a stress free package structure including a foamed polymer comprising polyurethane in order for the package to be shock resistant (column 4, lines 13 – 39). However, Eysermans fails to teach covering the wire bonds with the foamed polymer.

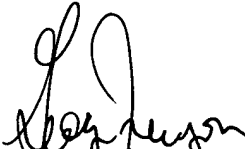
Conclusion

18. Papers related to this application may be submitted directly to Art Unit 2823 by facsimile transmission. Papers should be faxed to Art Unit 2823 via the Art Unit 2823 Fax Center located in Crystal Plaza 4, room 3C23. The faxing of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (15 November 1989). The Art Unit 2823 Fax Center number is **(703) 305-3432**. The Art Unit 2823 Fax Center is to be used only for papers related to Art Unit 2823 applications.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Julio J. Maldonado** at **(703) 306-0098** and between the hours of 8:00 AM to 4:00 PM (Eastern Standard Time) Monday through Friday or by e-mail via julio.maldonado@uspto.gov. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri, can be reached on (703) 306-2794.

Any inquiry of a general nature or relating to the status of this application should be directed to the **Group 2800 Receptionist** at **(703) 308-0956**.


JMR
8/23/03


George Fourson
Primary Examiner